CARBONYL SULFIDE

Carbonyl sulfide is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 463-58-1 O=C=S

Molecular Formula: COS

Carbonyl sulfide is a flammable, colorless gas or liquid. It is slightly soluble in water, soluble in alcohol and toluene, and very soluble in carbon disulfide and potassium hydroxide. It burns with a blue flame. Carbonyl sulfide can be produced by hydrolysis of ammonium or potassium thiocyanate and has a characteristic sulfide odor (HSDB, 1991).

Physical Properties of Carbonyl Sulfide

Synonyms:	carbon oxide sulfide; carbon oxysulfide; oxycarbon sulfide; carbon monoxide monosulfide
Molecular Weight:	60.07
Boiling Point:	-50 ^{o}C
Melting Point:	-138 ^{o}C
Density/Specific Gravity:	1.028 at 17/4 ^{o}C (water = 1)
Vapor Density:	2.1 (air = 1)
Conversion Factor:	1 ppm = 2.46 mg/m^3

(HSDB, 1991; Merck, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

Carbonyl sulfide is used in the synthesis of alkyl carbonates and other organic compounds. Carbonyl sulfide is a by-product of petroleum refining and destructive distillation of coal. Workers in the viscose rayon industry may be exposed to carbonyl sulfide (HSDB, 1991). The primary stationary sources that have reported emissions of carbonyl sulfide in California are gas production and distribution facilities (ARB, 1997b).

B. Emissions

The total emissions of carbonyl sulfide from stationary sources in California are estimated to be at least 35 pounds per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

Carbonyl sulfide is encountered in volcanic gases and sulfurous waters and has been measured in various soils (HSDB, 1991). It may be released from deciduous and coniferous trees (U.S. EPA, 1994a).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of carbonyl sulfide. However, the United States Environmental Protection Agency (U.S. EPA) has compiled ambient air data from several urban and suburban locations throughout the United States. Mean ambient air concentrations were estimated to be 1.2 micrograms per cubic meter ($\mu g/m^3$) or 0.49 parts per billion (ppb) from 1977-82 with an overall range of concentrations of 1.0 to 1.4 $\mu g/m^3$ or 0.41 to 0.57 ppb (U.S. EPA, 1993a).

INDOOR SOURCES AND CONCENTRATIONS

No information about indoor sources and concentrations of carbonyl sulfide was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

In the troposphere, the potential chemical removal processes for carbonyl sulfide are reaction with the hydroxyl radical and photolysis. However, both loss processes are very slow and the tropospheric half-life and lifetime of carbonyl sulfide are several years, and uptake by plants appears important (Tyndall and Ravishankara, 1991).

AB 2588 RISK ASSESSMENT INFORMATION

Carbonyl sulfide emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

The probable route of human exposure to carbonyl sulfide is inhalation (U.S. EPA, 1994a).

Non-Cancer: Exposure to carbonyl sulfide may cause irritation of the skin, eyes, lungs, and trachea. It is a central nervous system depressant (Sittig, 1991; U.S. EPA, 1994a). The U.S. EPA has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for carbonyl sulfide. No information is available on adverse reproductive or developmental effects of carbonyl sulfide in humans or animals (U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of carbonyl sulfide in humans or animals (U.S. EPA, 1994a). The International Agency for Research on Cancer and the U.S. EPA have not classified carbonyl sulfide with respect to potential carcinogenicity (IARC, 1987a; U.S. EPA, 1994a).